Electricity on the Farm

A MONTHLY MAGAZINE FOR THE UP-TO-DATE RURAL FAMILY

10 CASH PRIZES will be awarded for the best titles for the above picture. *(See inside back cover for rules)*

FEBRUARY
1936

ELECTRIC COOKING COSTS CUT 18%

The sensational new Westinghouse "Economizer" cooking unit combines top speed with greater economy than ever before reached in an electric range. Now *every* family can afford the cleanliness, automatic accuracy and convenience of electric cooking.

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5821

February, 1936

Electricity on the Farm

Vol. 9, No. 2

EDITORIAL

FARM SANITATION ADVANCES

How sweet from the green mossy brim to receive it,
As poised on the curb it inclined to my lips!
Not a full blushing goblet would tempt me to leave it,
The brightest that beauty or revelry sips.

* * *

The old oaken bucket, the iron bound bucket
The moss-covered bucket that hangs in the well!

SAMUEL WOODWORTH, 1785-1842.

When Samuel Woodworth wrote these immortal words, electric motors had not been invented; and nearly half a century was to elapse before the development of electrically driven pumps. Bacteria, as transmitters of disease, were unknown. The science of sanitation was in its earliest infancy.

So Woodworth might well be excused for his strong endorsement of the old open well with its moss-covered, germ-laden, bucket.

A more modern version of the qualities of the open well supply recently appeared in a poem in a publication of the American Public Health Association. There are three stanzas especially worthy of reproduction here:

How to queer to me now are the scenes of my childhood;
Just to think of the place I was born, reared, and grew
Makes me shudder and break out in cold perspiration;
It's the greatest of wonders I ever pulled through.

The ditch with the drainage, the garbage, and chickens,
The out-house all added their quotas of smell;
And right in the middle, with germ-laden bucket,
Was the open-top, ramshackle, shallow, dug well.

In winter, Ah then came the joys of the country!
The windows were nailed shut for once and for all.
Saturday night meant a bath for the entire family.
In the moss-covered wash-tub that stood by the wall.

Those who enjoy the twentieth century convenience of electric service, with sanitary, automatic deep well water supply and modern bathroom facilities can appreciate the tremendous advance of civilization, particularly in rural areas, during the past century. Not only does this advance mean greater comfort for those who live today, but infinitely better health as well, as is evidenced by the increasing life span. Truly, the advent and application of electricity has revolutionized farm life.

FRED SHEPPERD.

Issued Monthly by
CASE-SHEPPERD-MANN PUBLISHING CORP.
Editorial-Executive Offices: 24 West 40th Street, New York
KARL M. MANN, *President* — I. H. CASE, *Vice-Pres. and Gen'l Mgr.*
FRED SHEPPERD, *Editorial Director* — JESSE H. NEAL, *Vice-President*
K. H. GORHAM, *Advertising Manager*
CHICAGO: 6 No. Michigan Ave.—W. S. CLEVENGER, Western Manager; L. M. ROCHE, Western Representative
SAN FRANCISCO: 444 Market St., Room 305—C. H. WOOLLEY
Subscription price, 75 cents per year; single copies, 10 cents; Special Bulk Rates on Application
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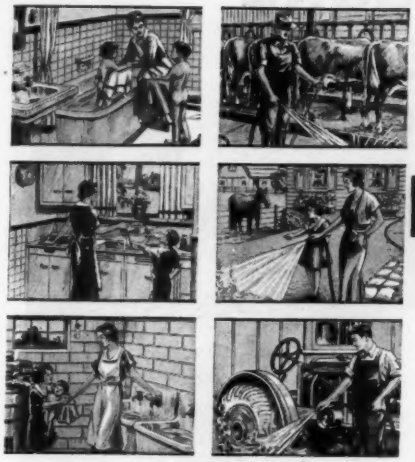

MYERS
WATER SYSTEMS

PROBABLY no time for several years to come will be more favorable than the present is for installing running water in your home. But before you choose the individual water system which is to supply it, regard your purchase first on an actual service basis. Remember that whenever water is needed, day or night, the pumping unit is supposed to furnish an instantaneous flow from any faucet you may open. That is what you *expect*—and that is what you *get* when you install a MYERS—the water system of highest quality. For reliability, choose a MYERS.

There are styles and sizes of MYERS Water Systems to suit all needs; for deep or shallow wells; for operation by motor or engine power. The prices on these reliable water systems are remarkably low today. You may find other water systems whose quoted price is less, but you will never find any which delivers water at a lower cost per gallon or gives more years of trouble free service than a MYERS. That is real economy. Mail the coupon today.

Water systems are one of the first improvements for which money may be borrowed from the Government under the Federal Housing Act. See your Myers dealer for information.

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Take Off Your Hat To The MYERS

WHERE HAS YOUR PEP GONE WHEN THE SUN GOES DOWN?

"I'll tell you where I go. Into the sweep of the broom - the tug of the mop - the trudge of feet - the bend of knees and plain old elbow grease. That's where!"

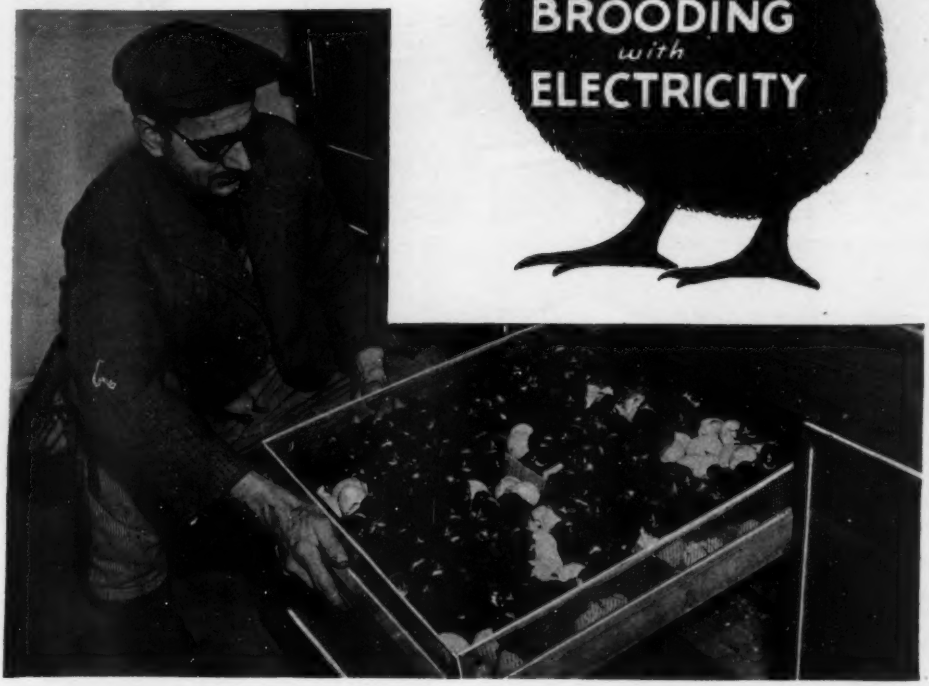
YOU can come to the end of the day with plenty of pep—if your home is all electric. Let electricity cook, heat water, refrigerate, clean and do the many other jobs that chase your pep away before the sun goes down.

YOU don't have to keep trudging back to coax an electric range. You just snap a switch to start an electric water heater and then forget it. An electric refrigerator saves food, saves time, saves steps, saves money. A vacuum cleaner makes housecleaning child's play.

IF you let electricity help with the housework, you'll be glad to go out for sociable evenings or will enjoy company at home. The radio will be a pleasure and won't put you to sleep, or you can really enjoy sewing or other needlecraft.

THE few cents electricity will cost you is a small price to pay for the energy you will save. Your Power Company or your local electric dealer will gladly tell you what it will cost to have these electrical servants in your home.

INCUBATING and BROODING with ELECTRICITY



H. W. Fitting, near Lafayette, Indiana, taking a tray of Barred Rock chicks from his electric incubator.

By T. E. HIENTON

ELECTRICITY has many practical uses on the poultry farm, two of which, heating incubators and brooders, are among the most important. Everywhere that electric service is available electric incubators are hatching fertile eggs into baby chicks, and electric brooders are raising chicks through the brooding period.

Many thousand all-electric incubators are being operated today in the 12,000 hatcheries of the United States, in which it is estimated one-half of the chicks raised annually are hatched. Probably the most rapid expansion in the commercial hatchery business has occurred during the past decade after the electrically heated cabinet incubator, with its motor-driven fans, appeared on the market. Incubators of this type today are available in sizes as small as 540 eggs for the breeder hatchery or farmer to as large as 65,000 eggs for the commercial hatchery.

Some individual farmers, who prefer to incubate their own eggs, are employing the smaller sizes of cabinet type incubators while others use smaller machines which may be had in as small as a 60 egg size. In many cases, kerosene heated machines have been converted into electric machines by the installation of an electric heating unit and thermostat.

Certain advantages, profitable to poultrymen, result from the use of elec-

Raising winter broilers in a colony brooder house with electric brooder near Pine Village, Indiana, January 1935.

Five of six electric brooders in operation on one floor may be seen in this interior view of the barn in which Glen Brutus, Pine Village, Indiana, is raising 9,000 winter broilers.

Interior of Jones Hatchery Lafayette, Indiana, showing all-electric incubator

tric heat in incubators which have been responsible for its wide adoption. Electric heat is easily regulated, it produces no fumes of combustion, maintains more accurate control resulting in better hatches, is clean and probably safest from fire hazard of all sources of heat for incubators, controls moisture easily and according to some hatcherymen produces more chicks.

A disadvantage which has been listed for the electrically heated incubator is the danger to eggs, which are being incubated, of a power interruption. Studies conducted by the Agricultural Experiment Station of the University of California reported in Bulletin 550 "The effect of current interruption in electrical incubation" answer this question.

Conclusions of this work are in part: "Twelve hours of current interruption in electrical incubation under room temperatures approximating 70° F., produced an average decrease in number of chicks hatched of 3.4 percent. The number of crippled and weak chicks was increased to approximately twice the number produced under normal conditions by the current interruption." It is evident from the results of these investigations that the losses from a current interruption of as long as 12 hours are very much smaller than usually anticipated. Inasmuch as current interruptions of this duration are very rare, it would seem that this objection has been considerably overemphasized.

Cost of electric energy for incubating is a very small part of the cost per chick hatched, especially in the larger incubators but not large even in the small machines. Records obtained by agricultural engineers of the Purdue agricultural experiment station showed a daily consumption of 1-1.4 kilowatt-hour for a 150-egg machine, 6-7 for a 1,400-egg machine, 7-8 for a 2,640-egg machine, and 12.5-15.8 for a 15,000-egg machine. With electricity available at rates of 3 cents per kilowatt-hour or less, energy cost for incubation will be less than one cent per chick with ordinary hatches.

Brooder and Incubator Keep Apace

The electric brooder has been developed during the past decade as rapidly as has been the incubator. Its adoption has not been as general as the incubator due largely to the fact that electric service was not available on many farms where the chickens were raised. Hatcheries were located in small towns or villages where electricity could be secured to operate the incubators. Articles which have appeared in *Electricity on the Farm* during the past year on electric brooding in the states of New Hampshire, Indiana, Pennsylvania, Kansas and Washington indicate that electric brooders are being widely adopted throughout the United States.

During the 1935 season tests which have been conducted by Purdue University at its agricultural experiment station near Bedford, Indiana, since 1933 were continued using six brooders of four different makes. The brooders were operated in 10 by 12-foot colony brooder houses without any additional artificial heat. An accompanying table shows the dates on which the brooders were started, the numbers of chicks raised, the percentages of mortality, and the energy used per flock and per chick raised.

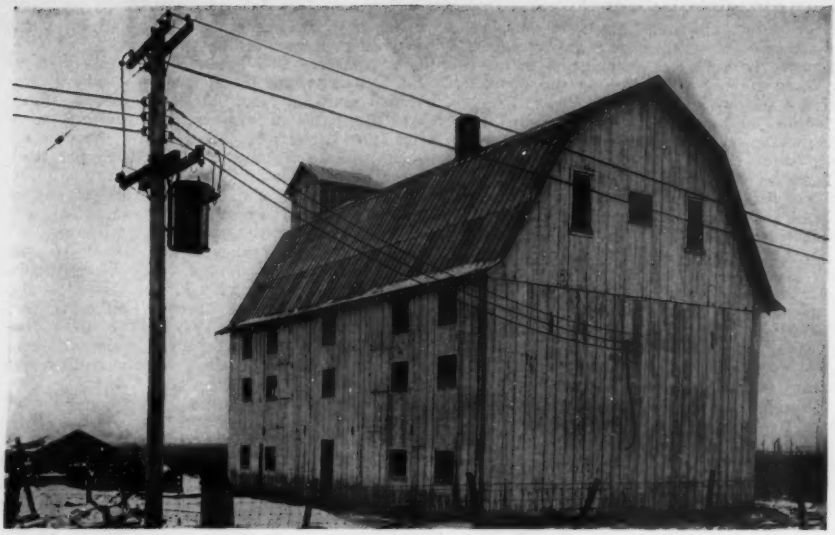
Mortality figures for the six brooders are of particular interest since this factor is one which is often used to measure the success of a brooder. A total number of 2,170 chicks were started and only 69 or 3.2 percent died during the brooding period. The uniformity of this very low rate of mortality is particularly interesting since all of the brooders showed the same low tendency. From the standpoint of energy consumption there is also a similar tendency to be very low although it is readily seen that as the season became warmer, the consumption decreased. In the case of the first brooder the energy per chick raised exceeds that of the others because of the smaller number of chicks started and the earliness of the season. Considering all of the brooders, the average use of 0.33 kilowatt-hour per chick raised resulted in an average cost for heat of one cent per chick at 3 cents per kilowatt-hour.

The results of three years' tests at this farm illustrate points which are of importance to electric brooder operators. In 1933 the average use of electricity per chick raised was 0.897 kilowatt-hour; in 1934, 0.592 kw.-hr., and in 1935, 0.33 kw.-hr. This steady decrease may be attributed to two factors, the first being the larger average number of chicks per flock. There were 281 in 1933, 337 in 1934, and 62 in 1935. The second factor is the knowledge gained by experience in conserving the use of energy by electric brooders, since the same man operated the brooders during the three years.

Electric brooders are being adopted for raising winter broilers by Indiana farmers in Warren and Benton counties. More than 300,000 winter broilers are being produced in this area annually for the Chicago market. Leaders in this enterprise are two brothers, Glen and Arba Brutus, and their mother, Mrs. John F. Brutus, all of Pine Village. For several years Mrs. Brutus has been hatching the chicks in her electric hatchery and the brothers have been raising the broilers in colony brooder houses on their farms during January, February and March. Prior to 1934, hard coal and oil heated brooders were used, but during that season 14 electric brooders were installed each of which was provided with a check meter by agricultural engineers at Purdue University. The saving in labor and reduced fuel cost effected by placing nine brooders in one long house has led Arba Bru-

1935 Electric Brooder Records, Purdue Farm, Bedford, Indiana

Brooder	Chicks started Number	Mortality Chicks Number	Mortality Percent	Brooding Started Date	Brooding Days Number	Energy Used Per Brood Kw.-Hr.	Energy Used Per Chick Raised Kw.-Hr.
No. 1	286	7	2.4	Feb. 25	56	180	0.64
No. 2	379	11	2.9	Mar. 8	56	139	0.38
No. 3	360	9	2.5	Mar. 20	56	118	0.34
No. 4	348	11	3.2	Mar. 30	56	124	0.37
No. 5	435	14	3.2	Apr. 12	53	73	0.17
No. 6	362	17	4.7	Apr. 23	40	73	0.21
Average	361.7	11.5	3.2		53	118	0.33



Old hay barn on Brutus farm in Warren County, Indiana, which was converted into plant for raising winter broilers with six electric brooders on each of the four floors.

tus to adopt electric brooders for raising his 1935 crop of broilers.

An old hay barn on the original Brutus farm has been converted into a broiler production plant by the second brother, Glen. An exterior view of this barn is shown in an accompanying illustration with an interior view (page 8) of five of the six electric brooders on one floor. Four separate floors have been installed with a pipeless furnace on the first floor, and an elevator at the end to raise and lower feed and other supplies. Twenty-three electric brooders are being operated in this barn to raise 9,000 broilers. By placing all of the chicks in this small area, Mr. Brutus expects that one man will care for them. This grouping would not be possible except for the elimination of fire hazard, which is present with other fuels, nor would the reduction in labor be accomplished where frequent attention is required by brooders using other sources of heat.

The writer wishes to add a note of caution to present or prospective users of electric brooders. Lamp cord is *not* of adequate size to carry the load of the average brooder, and should not be used for extending service to a brooder house or other brooder location. The use of wire large enough to safely carry the load of the brooder, without excessive voltage drop, cannot be too highly recommended for safety and satisfactory operation.

Interior of Brutus Hatchery, Pine Village, Indiana, operated by Mrs. John T. Brutus. These cabinet type incubators are all electric, being electrically heated and fans motor-driven.

A New Method of MILK PASTEURIZATION

The passage of electrical current directly through the milk results in a uniform generation of heat throughout. This is accomplished by an electro-pasteurizer (illustrated) such as installed on the Pinnacle Rock Dairy, Plainville, Conn.

By B. E. GETCHELL

AFTER years of research and investigation, Louis Pasteur, in 1864, presented to the world the first rudimentary principles of the process which we, in his honor, term pasteurization.

Since its introduction in this country, pasteurization has been increasingly demanded, and the present tendency is to pasteurize practically all milk sold for fluid consumption.

For the regulation of commercial pasteurization, the United States Public Health Service has defined milk pasteurization as being a temperature of 143° F., held thirty minutes, termed the Holder Method, or 160° F., held fifteen seconds, termed the High Temperature Method.

Until recently, commercial pasteurization has been accomplished by placing the milk in contact with heated surfaces. Milk is, unfortunately, such a poor heat conductor that when a quantity of milk is thus heated, wide differences of temperature appear in its various portions.

Electrical pasteurization offers a definite and positive solution of this problem in that the passage of electrical current directly through the milk results in the production of heat actually within the substances of the milk itself, and proper mechanical construction insures an absolutely uniform generation of heat throughout all portions of the milk.

Electrical pasteurization does not impair, even in the slightest degree, the natural milk properties.

Course of Milk Flow

The accompanying diagram shows graphically the course followed by the milk as it passes through the electro-pasteurizer. The milk is taken from the supply tank by an electrically driven pump

and passes through a control valve to the heat-exchange coil. The design of the heat-exchange coil is such that as the raw milk passes through the interior of the coil it is warmed to about 125° F by an exchange of heat from the already pasteurized milk flowing downward over the outer surface of the coil. From the coil the milk enters the bottom of the heating chamber. In this heating chamber, or electrode chamber, the milk itself becames the conducting medium through which flows a regulated 220 volt alternating current. This passage of electricity through the milk heats it to a pasteurizing temperature of 160° F or over, for which the control device has been set. As it leaves the electrode chamber the milk flows by the bulb of the control instrument and enters the holding chamber which is so designed that it takes 15 seconds for the milk to pass through, thus holding it the required length of time at the pasteurizing temperature. On leaving the holding chamber the milk passes into the spreader pipe where it contacts the bulb of the recording thermometer which records the milk temperature. The milk is released from the upper surface of the spread pipe and flows downward over the outer surface of the heat-exchange coil where it gives up part of its heat to the incoming raw milk, as previously explained. The milk leaves the heat-exchange coil at a temperature of approximately 85° F. Here the milk is either collected for cream separation at this temperature, or is allowed to flow downward over the water and brine cooling coils, reaching the receiving trough at the proper bottling temperature.

Electrode Chamber

The electrode chamber is rectangular in cross section, and varies in length according to the capacity of the equipment. Two opposite walls are made of carbon plates or electrodes spaced apart by heavy glass separators or insulators which comprise the other two walls of the chamber; 220 volt alternating current is connected to the carbon electrodes and in its passage through the chamber the milk provides a conducting medium for the flow of current and its resistance to this flow generates heat within the body of the milk itself.

To prevent the carbon electrodes from becoming overheated they are kept cool by a flow of cold water over their outer surfaces.

The milk is released to the heat-exchange coil from the top of the spreader pipe rather than from the bottom as is the usual practice. This upward discharge prevents any formation of the foam pockets generally encountered in ordinary spreader pipes. These foam pockets constitute a very definite menace to efficient pasteurization because they offer a likely source of bacterial contamination.

"For the regulation of commercial pasteurization, the United States Public Health Service had defined milk pasteurization, as being a temperature of 143 degrees Fahr., held thirty minutes, termed the Holder Method, or 160 degrees Fahr., held fifteen seconds, termed the High Temperature Method."

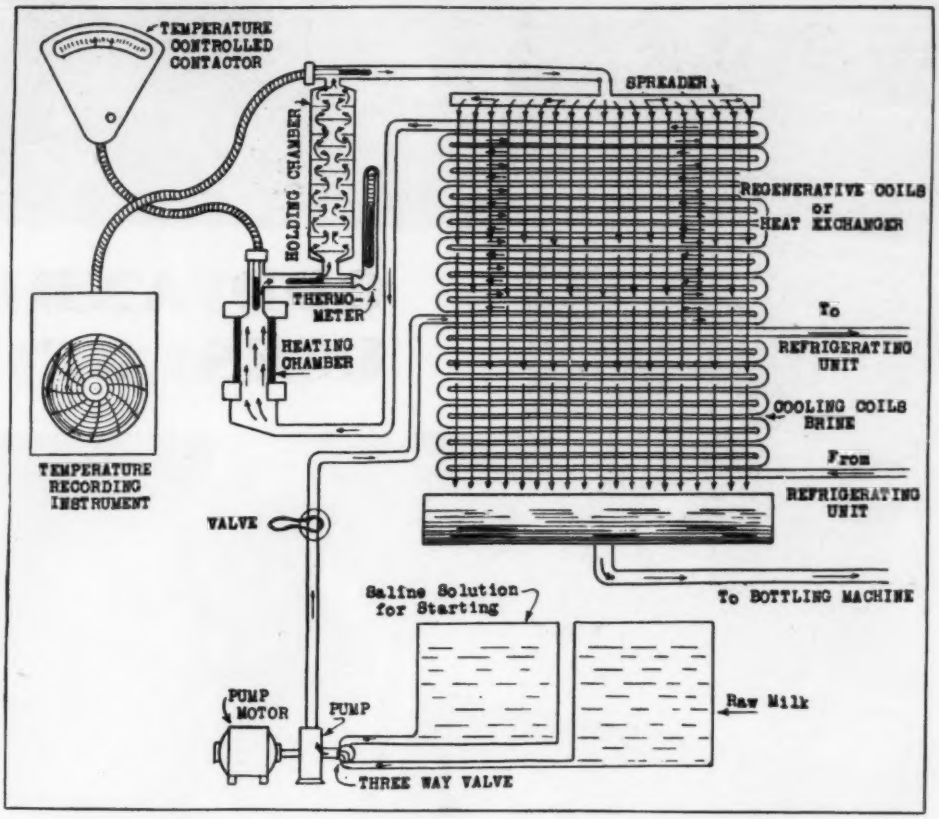
Temperature Control

The temperature control unit is an electrical contactor governed in its operation by the thermal reactions of a bulb placed in the milk stream where it leaves the heating chamber. This control apparatus modulates the power supply to the electrode chamber, so as to hold the milk within ½° F of any pasteurizing temperature above 160° F, for which the control dial may be set. This regulation of current to the electrode chamber automatically compensates for variations in the temperature of the raw milk, room temperature, line voltage, or variation in conductivity of the milk under treatment.

An auxiliary tank, holding approximately ten gallons, is provided besides the raw milk tank. Both of these tanks are connected with the pump by means of a three-way valve. In starting the plant the auxiliary tank is supplied with a chemical solution which is pumped through the system to completely sterilize the entire unit before the milk run is started. The auxiliary tank is then filled with a weak solution of salt in water of approximately the same electrical conductivity as milk. The dial of the control instrument is set for 180° F. The closing of a snap switch now places in operation the automatic temperature control apparatus. The temperature of the salt water gradually builds up, until in about five minutes it has reached 180° F, at which point it is held by the automatic controls. This serves to further sterilize the plant and remove all traces of the chemical solution which was pumped through as noted before. After about five minutes the control dial is set for 162° F, and the controls will automatically bring the temperature down to this point. As soon as the temperature becomes stabilized, actual pasteurization is begun by throwing the three-way valve and allowing the milk to follow through directly behind the salt solution. All this has been accomplished by the single operation of the two switches, setting the control dial and throwing the three-way valve.

No Operating Attention Required

The electro-pasteurizer requires no further attention until all the milk has been pasteurized. Any emergency that may arise, such as failure of power supply, failure of water flow over the electrodes, or variations in temperature of raw milk, will be automatically taken care of by the controls, and no milk will be permitted to pass into the holding chamber that is not up to proper pasteurizing temperature. If, for any reason, the temperature of the milk from the electrode cham-



Diagrammatic view of an electro - pasteurizer.

ber is not up to 160° F, the pump will automatically and immediately slow down, and the milk will be returned by gravity to the heating chamber for further treatment, and as soon as it has been returned the pump will again start, and test will be made on the milk, and if it has attained the proper temperature the plant will continue in operation. If not, the milk will return for further treatment. This operation will continue until the temperature is correct, at which time normal operation will be resumed.

Automatic Power Cutoff

If the flow of cooling water over the outside of the electrodes fail, which is liable to cause the milk to burn onto the electrodes, the power supply will be automatically cut off, and the plant will shut down. As soon as this water flow is restored the plant will automatically start again. As soon as the supply of raw milk drops below a predetermined level, an alarm sounds notifying the operator that he must either refill his raw milk tank or prepare to shut down the plant.

To synchronize the flow of pasteurized milk with the bottling machine, a control valve is provided which may be set approximately 15% above or below the normal speed of delivery.

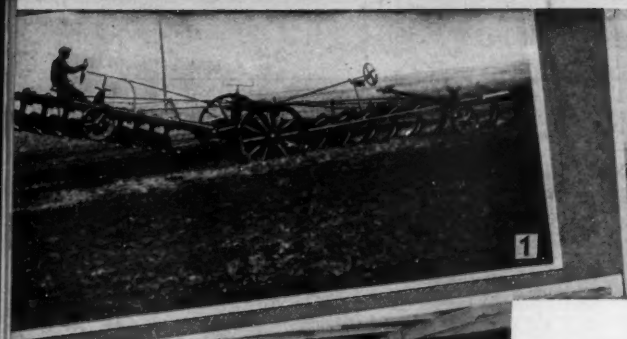
Thus it will be seen that after the plant is once started, it requires no further attention from the operator, except to keep it supplied with raw milk, or to finally shut it down.

The 100 gallon per hour unit, which is most acceptable to dealers handling anything under 1,200 quarts per day, occupies a floor space of about 2½ ft. by 7 ft., and if used with a bottling machine, requires a ceiling height of not less than 9 ft. It is easily installed. If the base, power line entrance, water and refrigerating pipes are ready, it can be installed and placed in operation within three hours after its receipt.

Operating Cost

An outfit of this size creates an electric demand of 15 kilowatts. Consequently it uses approximately 15 kilowatt hours for each 100 gallons of milk pasteurized. No extra labor is required as the plant is entirely automatic, leaving the operator free to devote his entire attention to bottling or any other duties. This low power consumption and economy of labor makes the costs compare favorably with those of other methods.

A dairyman near Hartford who has been using one of these plants during the past six months has increased his sales of milk over 100%, in a highly competitive territory.



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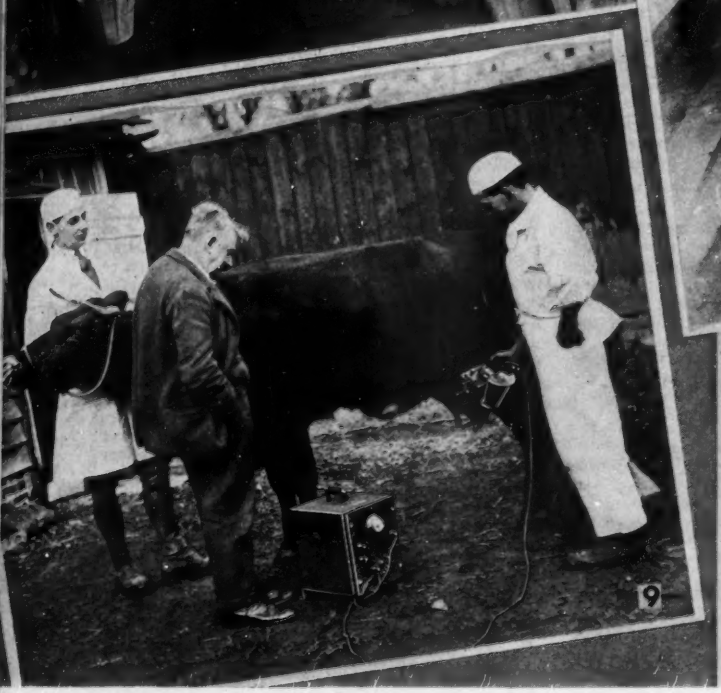
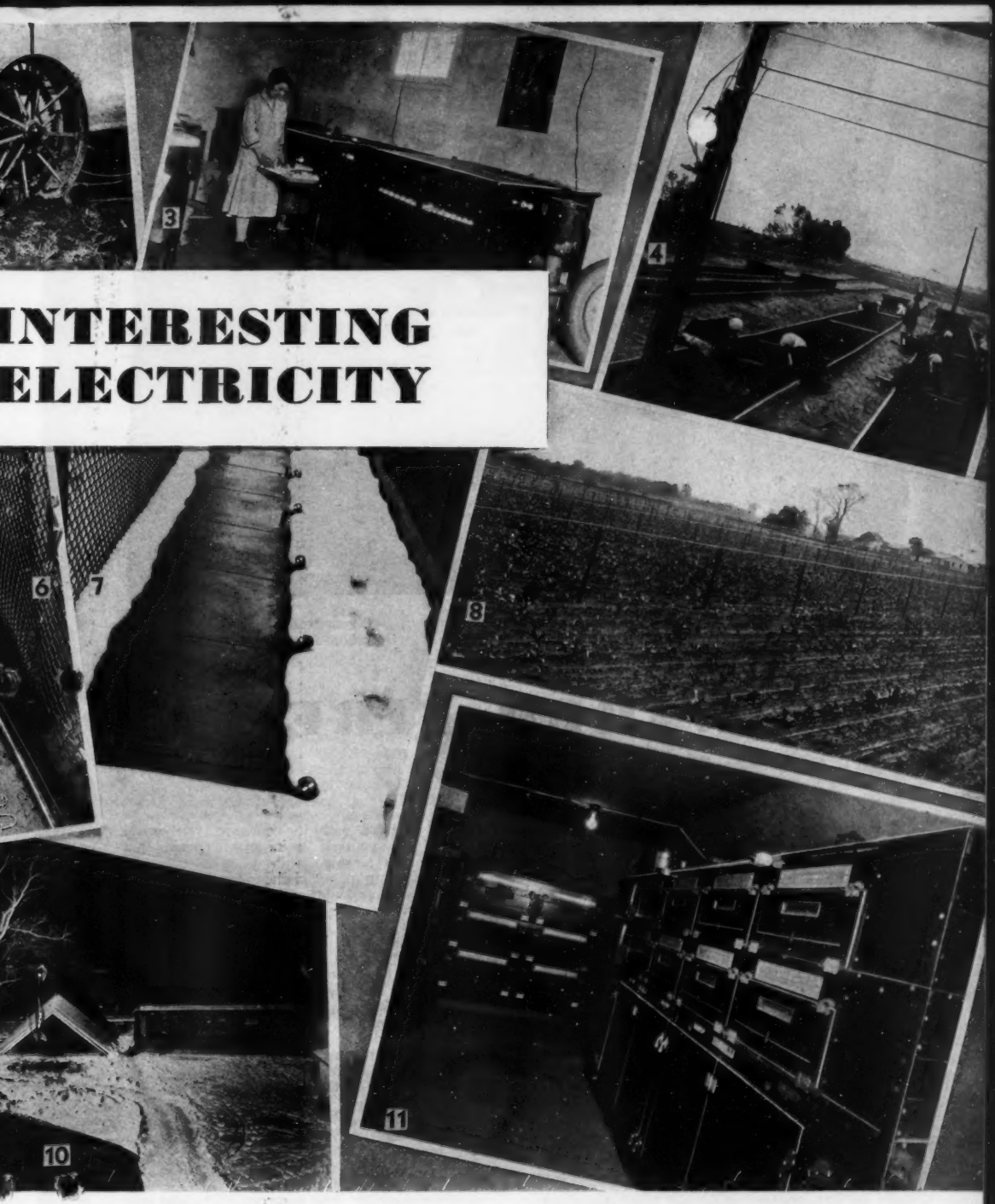
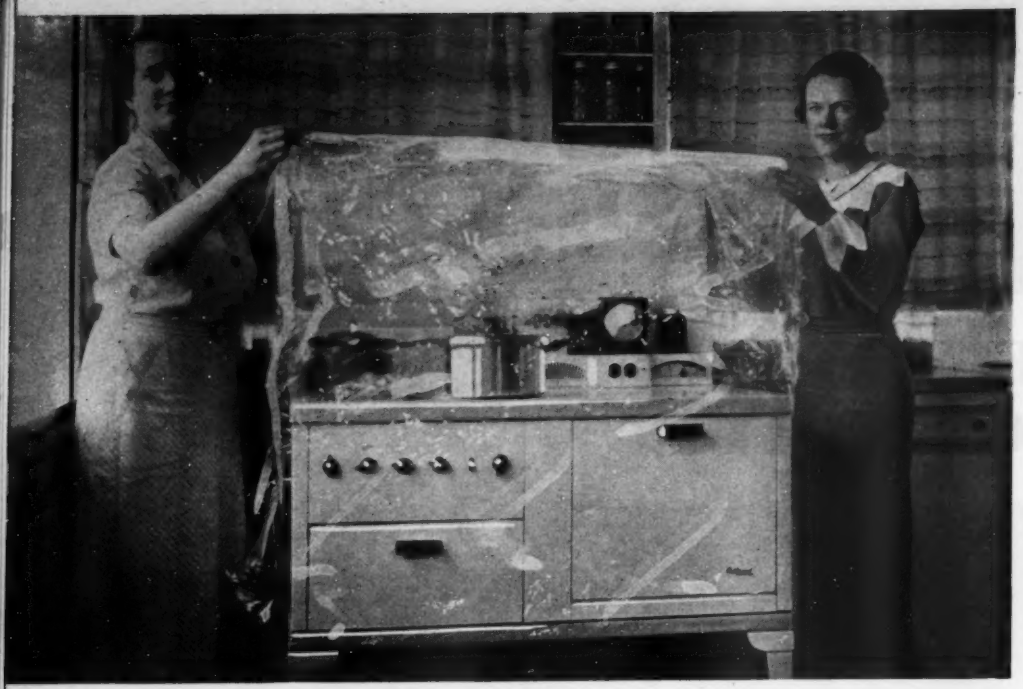


1. Cable operated plow in Soviet Russia. Cables are drawn by electrically driven drum. 2. The power plant of the electrical plow shown in Fig. 1. 3. Electric heat displaced kerosene burners on incubators at the Piepenbrink Farm near Terre Haute, Ind. 4. The sprouting of cotton seeds is done electrically on the Bairam-Alisky Sovkhoz (State Farm) in Turkmenistan. 5. Electricity furnishes the power for grading fruit on the Collins farm at Pensauken, N. J. 6 and 7. One way to keep snow off a



INTERESTING ELECTRICITY

walk—embedded electrically heated cables in the concrete. 8. The Hookstra farm, Beverly, N. J., gets artificial rain whenever it wishes from the overhead irrigation system. 9. Farmer Hickman of Hertfordshire, England, is watching one of his herd undergoing a violet ray treatment. 10. A floodlight, controlled by a switch in rear bedroom, lights up this farm yard. 11. A real business establishment is the poultry farm of Wm. Roach, Columbus, N. J., where electric incubators bring forth chicks.



Demonstrating safety with a cellophane wrapper over the range.

WIRED FIRE

By VERA B. MEACHAM

IF you are old enough, you will probably remember hearing your grandmother say, time and time again,

"Fire is a good servant, but a hard master."

In most parts of our country we have to have fires for warmth, but year after year in the modernization of our homes, by fireproof construction, by sound building, by better and better stoves, we have been making it increasingly difficult for fires to get the upper hand. Wherever the copper wires carry electricity, we can have heat to cook our food with no fire in the kitchen stove at all. This, I maintain, is a safety measure that every woman can appreciate.

I wish you might have been with me, all of you, at a meeting I attended last summer in the sunny spacious laboratories of a manufacturing plant where ranges are made. I wish you could have heard Miss Frances Weedman, the Home Economics Director, point out the special features of electric cooking that make it so successful and so delightful. I wish you might have seen Mrs. Mary Schwin put a dinner in the oven of a range, turn the current on, then wrap the whole range up in a celophane bag, and seal it till the dinner was done. I wish you could have seen Doris Aline cook a pudding alone, because if you had, back of all the convenience, the accuracy, the reliability of the electric range, more important than its speed, and hand in hand with its economy, you would have seen for yourself unforgetable proof that electric cooking is safe.

Electric cooking makes kitchens a safer place for those we love; for children first of all.

"Cooking with electricity is so very safe," Miss Weedman said in one of her talks, "that you need not be afraid to let the children learn to cook. Oh, I don't mean you can turn the job of getting the meals over to them, but you can leave them working around the stove without worrying. I'm going to let Doris Aline make a caramel pudding for you to show you just how easy it is."

With quick, deft movements she measured out one cup of light brown sugar, three tablespoons of cornstarch, and two cups of milk. She stirred these briskly and set the pan on the left hand front burner of the range.

"Now then, Doris," she called.

A shy little curly-headed five-year-old came slowly out on the stage.

"I'll lift you up on this stool; then you can make the pudding for us, can't you?"

Doris nodded her head vigorously. Settled comfortably on the high stool, she pulled her very short skirts sedately flat on her knees, caught her heels in the topmost rung and reached out for the long-handled spoon Miss Weedman was holding.

"The burner is turned on Low for this pudding,"

How will you have your eggs?

Miss Weedman pointed out. "It only takes a stir or two until the pudding begins to steam, but after that Doris will have to keep stirring right briskly until it is thick."

Then she turned back to us, leaving Doris and the pudding to take care of themselves.

"There are lots of reasons why electricity makes kitchens a better place for children," she went on. "There needn't be any matches in a kitchen that burns no fuel in the range for one thing. And you know as well as I do that matches start a good many fires nobody planned on. There isn't any flame around an electric stove to catch at little skirts, at tiny sleeves, or to endanger the whole household by licking at a flapping curtain or catching the corner of a dishtowel."

Doris Aline was stirring steadily by this time, her serious little face flushed and eager in her concentration on the job at hand.

"I couldn't let Doris make that pudding on any other stove I know of," said Miss Weedman. "She has to sit up close because her arms are pretty short. This stove isn't hot. Most of the heat is kept right under the bottom of the sauce pan. You aren't getting too warm. are you, Dorrie?"

The child shook her curls emphatically, but she didn't look up from the pudding.

"If this were my house and Doris were my little girl," Miss Weedman continued, "I could go up stairs and make the beds, or straighten up the living room without thinking about the fire at all. You can see that there is no flame, there are no fumes, there is nothing that could blaze up suddenly, nothing that could possibly explode. If I *did* leave her here, I would do it secure in the knowledge that there is just the same constant, safe heat under that pudding that there was when I put it on. And there would be no more and no less, if I left the switch turned on all day."

A steady fire,—a low fire, a medium fire, or a good brisk fire to hurry things along, because you can have any of them just by turning a switch, you banish forever that dangerous short cut to a quick fire, a little old salmon can, one side pinched together for a spout, the can that used to stand behind the stove half full of kerosene. You know

If somebody turns on the current, a little heat will be lost; that's all.

Learning to cook.

as well as I the toll of lives and property this can takes every year.

Finally Doris looked up from her stirring.

"It's done," she announced in a soft little voice. "My pudding's all thick."

"Sure enough," said Miss Weedman, turning to look at the pan. "Jump down, Dorrie, and we'll put your pudding in this blue bowl so you can take it right down that aisle and show these women what a good cook you are."

Children too young to cook can play around an electric range with perfect safety to themeslves and the stove. The only thing they could do would be turn on a switch, and if they did there is nothing that could hurt them; there would be just a little heat lost in the air; that's all.

After we had looked at Doris' pudding with all proper admiration, we went out into another room. There along one wall was an electric range completely covered with cellophane. I do not mean that it was wrapped up for somebody's Christmas present, or just sealed up to keep out the dust. Neither one; it was cooking a dinner.

"This morning quite early we put into the oven a chicken cut up, dipped in butter and flour for oven frying, a dish of rice to steam, a fruit pie and a pan of rolls," said Mrs. Mary Schwin, one of the assistants in the laboratory. "We set the clock to turn on the current at ten-thirty and to turn it off at ten minutes off twelve. The thermostat is set at 375. After we got the dinner all into the oven, we slipped this cellophane bag over the range, and we haven't touched it since."

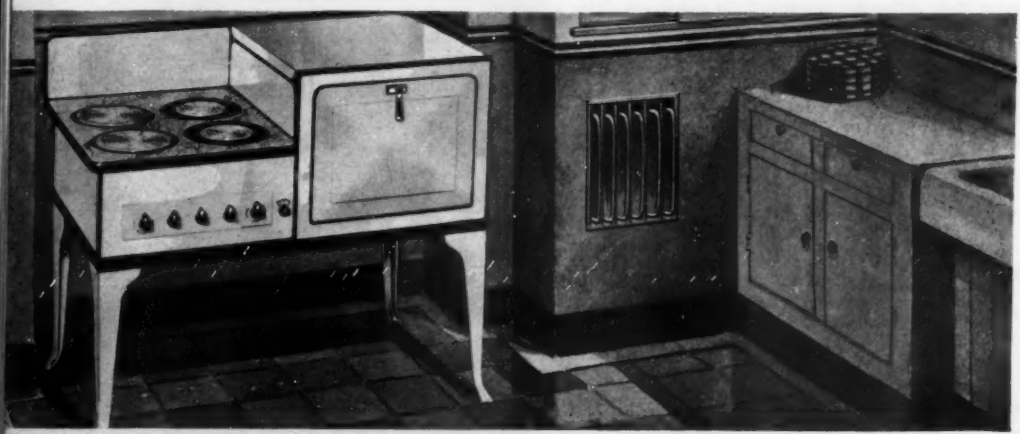
Now the point Mrs. Schwinn was emphasizing in her demonstration was the way a clock and a thermostat on an electric range can free the housewife from constant kitchen duty. But another feature impressed me, too. Here is a range that will not even set fire to cellophane when completely wrapped up in it. Did you ever burn a piece of cellophane? Goes up like a flash, doesn't it? Could you wrap your stove in cellophane and leave it cooking a meal? Yet here is proof that you can start your dinner in an electric range, then go away and leave it for hours with never a thought of danger, because there is none.

The National Board of Fire Uderwriters consider an electric range so safe that they list it with their approved appliances. Since it burns without flame, needs no supply of fuel, has no chimney to burn out on a cold winter night, and has its wires well protected, it does seem to offer small chance for a fire to get in, doesn't it?

"Let's take the cover off and see how our dinner is getting along."

Miss Weedman and Mrs. Schwinn carefully lifted the big, glassy envelope from the range, and Mrs. Schwinn opened the door. The chicken was brown and crisp and sent up a heavenly and inviting odor that all but undid the audience. The rice was fluffy and light. The rolls and pie were delicately browned. Nothing could have looked better.

"There is just one more thing I want to show you about this controlled heat," Miss Weedman walked over to another range where a woman was frying hamburgers. "Try this some time." And she expertly tucked a sheet of waxed paper over the hamburgers in the pan. This keeps the heat in, and it keeps the fat from spattering all over the top of the range. Since the heat is under the bottom of this pan, not flickering up the sides, the paper can't catch fire. It is quite safe on top of the meat, and it makes frying a cleaner job."



Without wood box or chimney.

The electrically equipped grain house on the Troyer farm in north central Indiana.

Electrified SEED CORN

By BYRON L. TROYER

THE seed corn that we sell is not charged with current, but electricity does play a big part in getting it ready for market and insuring that the germination is nearly perfect.

We (my father, C. E. Troyer, and brother, Eugene and I) farm 200 acres in north central Indiana and corn provides most of the farm income as our farm land is river bottom soil and does not produce small grains profitably. Fertility is kept up by raising sweet clover and alfalfa, and occasionally, soy beans.

Raising high yields of good quality corn of the best varieties has created a demand for our seed corn and the past several years we have sold from 400-1,000 bushels of seed, which has netted a good income. Official yields of one hundred or more bushels to the acre in the Indiana Corn Growers yield contest for eleven different years and the fact that our father has won the grand championship at the International Grain and Hay Show, for ten ears of corn, three different years has helped greatly in finding a market for seed.

However, to satisfy a customer so that he will come to the farm again for seed, it must be carefully selected and then well taken care of. A special seed house capable of storing 1,000 bushels of corn in racks so that no two ears touch was built eight years ago.

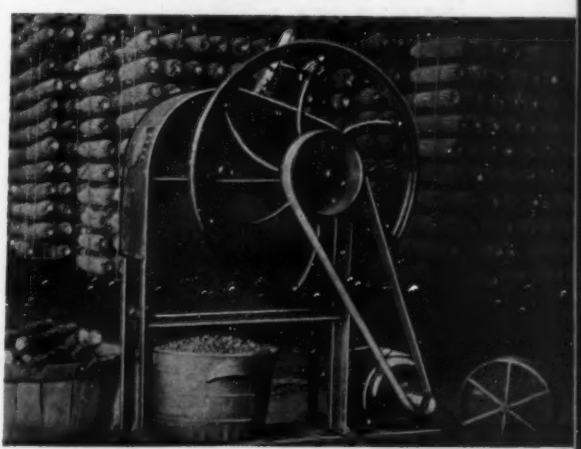
To insure good germination, the seed is field-selected as soon as possible after it matures, and dried in the racks. Adjustable window ventilating fans, operated by elecricity, keep the air moving through the seed house in late fall and early winter. This ventilation, together with the warmth from an electric heater, reduces the moisture content so that the seed has little or no chance of harm from damage through the germ freezing.

The heater is kept going on sub-zero nights and keeps the house quite a bit warmer.

A half-horsepower, repulsion-induction type motor is used to run the sheller and cylinder grader. The sheller, run by the motor, has a capacity of ten or more bushels per hour. As nearly as I can judge, the current used to run the sheller costs about three cents an hour.

The electric motor possesses many advantages over the 1½ horsepower gasoline engine which was formerly used. There is no trouble from carbon monoxide gas and we can operate the sheller during the cold, windy weather of the seed corn season without opening the doors. The job was formerly a cold one, with a headache from

(*Continued on page 21*)



Motorized shelling equipment and electric heater form a part of the seed house equipment.

An adjustable elevator will be found useful wherever baled hay or sacked grain is stored. A 1½ H. P. electric motor provides power for the unit shown.

ELECTRIC MOTOR REPLACES DOBBIN

By HOBART BERESFORD

IF you have ever hoisted baled hay or straw and sacked grain with a horse and a block-and-tackle, you are familiar with one of the chores found on many otherwise modern dairy farms. It doesn't make much difference in the type of barn you have because whenever bales and sacks are piled, it is bound to be a lifting job.

For several years a horse and block-and-tackle had been used at the University of Idaho dairy farm for handling baled straw and hay and sacked feed. In the system of stabling the dairy cattle at the University, the elevating problems common to the three general types of dairy barns had to be solved. Typical of the majority of general farm barns the milking barn is a two-story bank barn with a story and a half wing attached. The inside dimensions of the box stall section are 64 x 47 feet. This wing of the barn has a standard gambrel-type roof. Due to the width of the barn the heighth from the mow floor to the ridge pole is 34 feet.

The usable cubic space of the mow is 64,000 feet. The load limit of the floor will allow baled hay to be piled an average of 20 feet high, or 13 bales high, with safety, making a cubic hay storage space of 51,000 feet. The driveway enters the mow on the side of the barn about the center. If this driveway, which is 10 feet wide, is kept entirely open, 15.6 per cent of the cubical area of the mow and likewise of the hay storage space is wasted. After both sides of the mow are filled, however, the back half of the driveway is filled, making a loss of hay storage space of 8.3 per cent. Even with the driveway, the height and width of the pile makes the use of a horse and block-and-tackle economical in elevating about half the hay stored.

Hay or straw stored in the story and a half wing of the barn must be elevated 11 feet from the ground to the mow, typical of most standard two-story barns. Adjacent to the barn is a storage shed for hay and straw. Attached to each side of the storage shed is a loafing shed where most of the herd is kept except at milking time. The inside dimensions of the center section are 83 feet by 29 feet, and 27 feet from the ground to the ridge pole. The usable cubic space represented is 48,180 feet, and the shed has a capacity for about 600 tons of baled hay and straw. Hay is piled 20 feet, or 13 bales high. Due to the length of the barn, the hay must be dragged a maximum of 40

feet, even when filled from both ends. Dragging the hay back is no small part of the task of piling.

The elevating facilities required for the three different types of barns have been found in a standard model portable elevator similar to those used in grain warehouses for piling sacked grain. A one and one-half horsepower electric motor provides ample power to drive the elevator. The only alteration required to fully adapt this equipment to the job was to increase the size of the truck wheels to facilitate moving the unit from one barn to the other. The elevator is adjustable from a minimum lift of approximately 9 feet to a maximum lift of about 19 feet. For the past three years baled hay and straw have been piled in the dairy farm barns by the aid of this machine. Several check runs that have been made on the rate of handling hay and grain with this equipment show that for continuous operation hay may be handled at the rate of 5 bales per miunte, or 300 bales per hour. This is at the rate from 18 to 20 tons per hour, or equal to as much as 5 men and a horse could handle in a 10-hour day with the old block-and-tackle system. Only three men are required to operate the elevator unit. The electric motor powered outfit can handle from 70 to 80 tons per day, or about four times as much as was handled under the old system.

Figuring out the costs on the basis of the 300 tons of baled hay and 150 tons of baled straw handled annually on the dairy farm, the elevator outfit averaged about $0.13 per ton, as compared with about $0.50 per ton for the horse and 5-man crew. The original investment in the piler and motor under western prices is about $500.00 This may seem too great an investment for a machine used for a comparatively short time; however, if 400 tons or more of baled hay and straw are to be handled yearly, the saving per ton in the elevating and piling would pay for the machine in three years. In addition to this, there is a great deal of saving to be considered by the prevention of waste and losses accompanying delays in getting the feed under shelter. Also, having all the feed and bedding stored above the cattle so that it can be shoved down chutes to the first floor, thus minimizing the labor of feeding and bedding the cattle during the winter season, is a decided advantage.

Electrified Seed Corn

(*Continued from page* 19)

gas often accompanying it. The motor doesn't require the tinkering and repair work that the engine did. We first tried a quarter horsepower motor, but it did not have sufficient power for the job.

A couple acres of gladiolus bulbs are raised by our father and the heater and ventilating fans come in very handy in drying them. The bulbs are stored in a cellar which is damp and somewhat cold. The heater keeps them from freezing on cold nights and the fans drive out moisture that might cause the bulbs to rot or mold.

Of course, there are lights in the seed house and bulb cellar and inasmuch as there is a lot of work crowded into a short time, the lights help out in getting the seed stored early as we can put the corn in the racks after dark during the gathering season. This helps to eliminate losses which come by having germination of the corn hurt in the field by early freezes.

Inasmuch as houses are far apart along the route of the electric line, the rate here is much above that usually paid in the country, but we feel that the use of electrictiy in connection with the seed corn and bulbs more than pays the entire bill.

One of the adjustable window ventilating fans operated by electricity which keeps the air moving through the seed house in late fall and early winter.

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ELECTRICAL HOUSEKEEPING

Conducted by
GAIL MEREDITH

IRONS

JO DUNBAR was ironing when I stopped in there a week or so ago to leave a message for her husband. Of course I stayed to chat a little, partly because I am very fond of Jo, and partly, I suppose, because the kitchen seemed so warm and cosy, after the biting, blustering cold outside.

"That looks like a dandy new iron you're using," I said.

"Yes—s," agreed Jo, hesitantly. "It isn't new, though, I've had it a year. I'm not so sure it's a dandy either. It looks nice, but it just won't heat up. I've hated to say anything because Jim gave it to me, but really, Gail, I just can't get it hot enough to do my ironing."

"For pity sakes," I exclaimed getting up and going over to the ironing board. "Let me look at it." I took the iron out of her hands and turned it up so I could see the name plate. "1,000 watts. I thought so. There should be enough heat there for you to iron your heaviest table cloth as wet as you like to iron it."

"Try it if you don't believe me. Just try it," urged Jo, pulling a napkin from the basket beside the board. "You can see for yourself."

I turned the lever on the top of the iron to *linen.*

"What are you doing to that?" asked Jo.

I looked at her in some surprise.

"What am I doing? Why, I just moved the lever to *linen.*"

"Moved a lever—? to what—did you say, linen? What on earth are you talking about?"

The bewilderment on Jo's face was so unmistakable that I began to suspect the trouble.

"Do you mean to tell me, Jo Dunbar, that you've had this iron for a year, a whole year, and haven't used this lever to change the heat to fit the fabric you're ironing? Don't you know that this is an automatic iron and that you can set this lever for quite a number of different heats, and that a thermostat inside the iron somewhere will keep that heat just right for you?"

Jo shook her head helplessly. "I didn't even know it was a lever. I never noticed it particularly. Let me see it."

For a whole year she had been ironing shirts and sheets, towels and tablecloths, dresses and underwear, all with the thermostat set to hold the heat rigidly to a temperature right for silk, where the lever happened to be when the iron was given to her. No wonder that iron was seldom hot enough to suit her needs.

It doesn't sound possible, does it? But it happened, I tell you.

Once I had turned that lever to the point on the dial marked linen, the iron began to get really hot immediately.

Automatic irons today are designed to provide just the right ironing temperature for any fabric in your basket. They are built, many of them, to use 1,000 watts, enough to heat them quickly, and to help them hold the heat even when a fast ironer dashes them over wet linen.

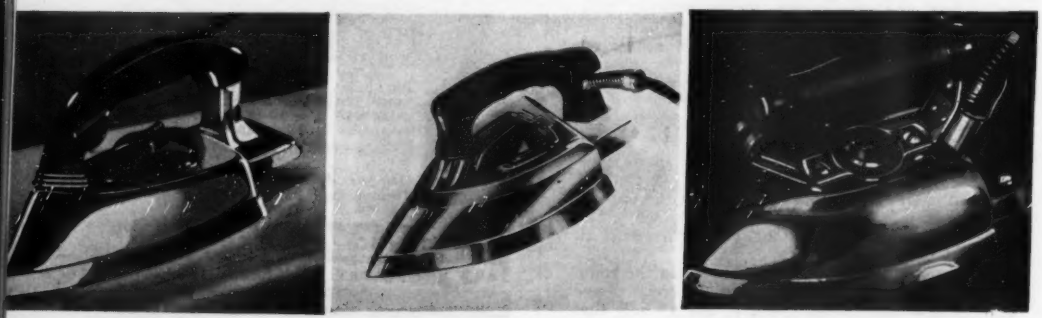
The dials may be marked low, medium, or high, with many little steps between, or they may be marked, and this is more common now,—with the name of the fabric to be ironed.

The thermostat maintains the right heat more accurately than we ever could by pulling the plug out and pushing it back in, testing the iron meanwhile with a wet finger. Moreover the right heat is not the result of guess work on our part, but the result of careful tests and experiments by many engineers who have studied both irons and textiles.

It is not likely that anyone is indifferent to the gain and saving in using an automatic iron. Besides giving better ironing temperatures and longer life to materials, it is a very effective safeguard against fires that may start from carelessness in leaving an iron flat on the ironing board with the cord plugged in.

While no one can have two minds about the value of an automatic control on her iron, and while it seems quite unlikely that there will be much difference of opinion about the desirability of 1,000 watts in an iron, their weight is a different matter. There is active partisanship for six-pound irons, and heavy rooting on the other side for irons that weigh three, three and a half, and four.

Before any woman closes her mind against the desirability of these light-weight irons, I wish she would think for a minute of the number of times she lifts her iron in going over a pillow case, for



Some of the new irons are streamlined like the Burlington Zephyr. Some have the cords permanently attached. Some have a headlight in front.

Let Us Help You Find It!

THIS page belongs to our readers. Its purpose is to help you get all the facts you want about any electric operated equipment that can be used to advantage on your farm. It's a FREE SERVICE and NO OBLIGATION.

Below you'll find a list of the more important applications for electricity on the farm and in the home. All these have withstood the test of years of service on money-making farms.

Which of these will perform operations on which you need help? Be sure to study our advertising pages, for these manufacturers are best equipped to help you.

For any additional information use the handy coupon below.

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—Automobile Engine Heaters
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—Electric Fencing
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—Ventilators
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instance. Does she lift it six, eight, or ten times?

If it is the first, she lifts 36 pounds in using the six-pound iron to iron the pillowcase, and 18 pounds with the three-pound iron. Imagine how much this would be multiplied for a sheet?

For silks and cottons, and for the lighter linens, the feather weight iron does an excellent job. It will iron the heavier materials, too, but some women do prefer the six-pound iron for sheets and heavy tablecloths, if they still do these by hand.

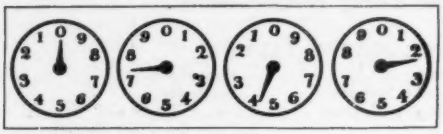
• • •

READING THE METER

IF you could catch your meter reader when he has a few minutes to spare, he would be glad to teach you how to read your own meter, I am sure. Of course, I am supposing that you want to know how to read it, just as you like to be able to tell time or figure up the grocery bill.

But if you forget to ask him, or if, when you think of it, he really cannot stop, there is no reason in the world why you should not go down and figure it out for yourself.

Most likely your meter has four dials. They will look like this. The one at the far right will



be numbered clockwise. On the next one the figures will march in the other direction. The third one is back to the familiar clock face numbering, and on the fourth, like the second, the figures go counter clockwise. You have to remember this difference in the direction the pointer takes on the different faces to read the dials correctly.

The pointer on the first dial at the right moves once around its face each time you use ten kilowatt hours. It records the units in keeping track of the electricity you use. The pointer on the second dial will move from zero to one in that same time because it keeps track of the kilowatts by tens. The pointer on the third dial will not move to one until the pointer on the second has gone clear round that dial, and the pointer on the

(*Continued on page 26*)

Is ELECTRIC Brooding Best?

Poultrymen Who Have Used

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ELECTRIC BROODERS

Say YES! ***Here's Why*** It is safe to use—**no fire hazard.** Much Time and Labor are saved. It is nearest to Nature's Method.

Chicks accept it **more quickly** than other types. **Grow faster** and **more vigorous.** The TRUMBULL is always dependable.

Costs 1/3 Less Than Coal to Operate

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1012 Woodford Avenue **Plainville, Conn.**

A GENERAL ELECTRIC ORGANIZATION

ON THE AIR

Conducted by JEROME J. HENRY

Farm Hour Keeps Country Families Informed

THE season of livestock shows having been completed, programs of the National Farm and Home Hour now feature timely informaiton of importance to farmers throughout the country. Each noonday over NBC stations this long established feature sends fine entertainment, blended with practical information to all who choose to listen.

Recently inaugurated in the hour was a series of agricultural college programs which take listeners to outstanding land grant colleges in the various states. These programs will run on the third Wednesday of each month in the regular Farm and Home Hour period. Tune them in to obtain news and information of the accomplishments of your state college or of neighboring colleges.

• • •

Elevator Man Becomes Radio Actor

A VOICE overheard by chance in an elevator is the voice many of you have been hearing in the G-Men series over NBC stations. Bill Mende, the basso-profundo narrator, came from his native Cleveland to New York to become an opera singer. But Phillips Lord, author of the G-Men dramtizations, chanced to hear his deep voice in an elevator.

Bill was born in 1912. Following his high school education he was advised to go East in search of fame and fortune. Less than a year ago he hitchhiked from Cleveland to New York where he landed a job as elevator operator at a hotel. He worked during the day and took singing lessons at night.

His radio career began when Phillips Lord stepped into his elevator one day and was asked which floor he wished. The startling depth of Mende's voice intrigued Lord so he (Lord) invited him for an audition. The audition was successful.

Up to the time Bill spoke with Lord, his elevator job consisted chiefly of answering questions for curious visitors who were trying to prove to themselves it was really Mende who spoke to them. He says it was annoying for awhile but gradually he became accustomed to answering irrelevant questions and soon began to enjoy it as much as the questioners did.

Bill sings in the choir at a New York cathedral. The thing he likes most, besides his radio work, is Walt Disney's Silly Symphonies.

• • •

Major Bowes Gives Many a Chance

AMONG today's most popular radio programs is that of Major Bowes featured each week over a nation-wide NBC network. This program is popular perhaps not so much because of the quality of its features but because many of those who participate in the programs are representative of thousands of listeners who either have had or are hoping for a chance to show their talents.

Major Bowes possesses a facility for putting his

amateurs at ease that they may do their best in the important trial before the microphone. Then, too, the program is so outstanding and different from the ordinary run of radio entertainment that millions look forward to it from week to week.

The amateurs present every imaginable sort of entertainment that can be sent over the radio waves. How many listen is not known, but thousands upon thousands of votes for various amateurs are received each week by telephone before the program is completed. Thousands more write in to cast their votes for a favored performer.

One of America's greatest baritones, Lawrence Tibbett is offering a colorful parade of dramatic songs with Don Voorhees orchestra every Tuesday night. For three years running Tibbett has been named as the outstanding male singer on the air.

Then the winners are given an opportunity to further develop and capitalize their talents on the stage and over the air.

Major Bowes designed the program to give as many aspirants as possible a good chance to demonstrate their ability to the American public. His program has achieved a double-barrelled purpose of giving excellent entertainment and providing a chance for those who appear in it.

Questions and Answers

Conducted by H. J. GALLAGHER

Cooking by Electric Range

Question: *Is farm cooking by electric range becoming frequent? If so, what is the average monthly cost of operation for a family of four to six persons?*

S. S.

Answer: Electric range operation is rapidly increasing in popularity due to its many advantages and low operating costs. It is a safe prediction that the future cooking fuel of agriculture will be electricity.

The cost of operating an electric range naturally varies with the electric rate in effect and the numerous economies that can be practiced by an experienced operator.

It is generally considered that the energy consumption ranges from 20 to 30 kw.-hrs. per person per month where all the cooking is done electrically.

In my own family of five we have used an electric range for ten years. It has done all of the cooking except baking bread. The average monthly consumption is 116 kw.-hrs.

Water Supply from Spring

Question: *Could there be a water system installed in a spring the same level as the house? Spring 600 feet from house. How low costs? Desire guaranteed results in a basement house.*

C. L. D.

Answer: Under the conditions described, it would be more satisfactory to install a shallow well water system in the basement of the house than at the spring. The only condition under which it would be necessary to install the pump at the spring would be if the level of the spring was sufficiently below the level of the basement that the combined friction loss in 600 feet of pipe and the vertical lift would result in a combined vertical lift the equivalent of 20 feet. Shallow well pumps with a capacity of 340 gallons per hour together

(*Continued on page 26*)

CHROMALOX

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Reduce Cooking Costs

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What's New

Reviewed by T. E. HIENTON

Names and addresses of manufacturers of the articles described in this column will gladly be furnished upon request. Address your requests to What's New Department, ELECTRICATY ON THE FARM, *24 West 40th Street, New York, N. Y.*

Electric Sump Pump

Removing water from basements of farm houses by hand pumps, or buckets is a not uncommon occurrence on many farms during occasional heavy rains. The importance of prompt removal is usually very great because of danger of damage by the water to the furnace, stored vegetables and other materials. By using an electric sump pump the water may be quickly and easily removed to minimize the damage from it.

The middle-western manufacturer of a well known line of pumps has recently developed a new sump pump. The pump is of a vertical centrifugal type with case and impeller of bronze, shaft of stainless steel and brass column. The discharge opening is a part of the top of the pump case and tapped for a 1-inch pipe, requiring no pipe fitting for connection. Power is provided by a vertical ¼-horsepower motor for 110-volt, 60-cycle, single phase, a.c. service. This motor is equipped with ball bearings, drip-proof enclosed top and a protective device to prevent overloading.

Questions and Answers

(*Continued from page* 25)

with pressure tank, electric motor and automatic switch can generally be purchased for about $75. Larger pumps are somewhat more expensive.

Six hundred feet of 1½-inch pipe for a 340-gallon pump would be the correct size to use. It is very important that the pipe be installed below frost line.

Water System for Home

Question: *What size tank and motor would be be necessary to supply an eight room house with water from a well 15 feet deep and close to the house?*

J. E. C.,
Hamlin, Penna.

Answer: Any of the standard commercial shallow well units should admirably answer your pumping requirements. Ordinarily it is better to purchase a pump with sufficient capacity to care for peak loads over a long period of time. A pump with a capacity of 440 gallons per hour would answer most purposes for home pumping where sprinkling, washing the car and some fire protection would be among the requirements. Usually a unit of this size is powered with a 1-3 H. P. motor. The size of tank may vary from 30 gallons to 100 gallons. With the larger tank the motor cuts in less frequently, which reduces radio annoyance.

Reading Your Meter

(*Continued from page* 24)

first dial has made its round ten times, for this is the dial that measures the kilowatts by the hundreds. The fourth dial records the measure by thousands, and its pointer moves from one number to the next each time the pointer on the hundreds dial makes a complete revolution.

When you are reading the dials, you always use the figure that the pointer has already passed. Here is where you have to watch yourself carefully to make sure you are following the pointer in the right direction, clockwise or counter clockwise.

Jot Figures Down

If you will write the figures down in the same order in which they appear on the dials, you will have the right meter reading.

On the first dial at the right the pointer is between two and three. Since we must take the number the pointer has passed, we take two. The next one gives us four, the third seven, and the fourth, nine.

9,742

Since that meter was put in use, some one has used 9,742 kilowatt hours of electric energy. To find what you use from month to month, you have only to keep track of the meter reading at the beginning of the month, and subtract it from the reading at the end. That will give you the number of kilowatt hours you used during that time.

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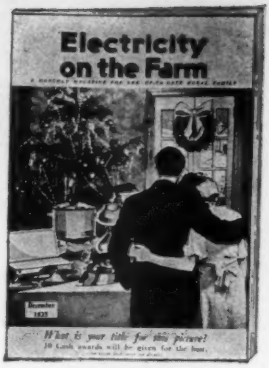

DECEMBER COVER

COVER TITLE AWARDS

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MRS. WILLIAM D. LENKER, R.F.D. 3, Harrisburg, Pa.

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"Two arms! with time to 'waist' when
Christmas is electrically applied."
MRS. R. L. SCHAEFFER, 30 No. 8th St., Allentown, Pa.

"Xmas spirit, old as the hills
But electric gifts bring new thrills."
CHARLES FOWLER, R.F.D. 1, Greentown, Pa.

"An electric iron, cooker and grill,
On Christmas morn give your wife a thrill."
MRS. CHAS. L. TULLER, R.F.D. 2, Worthington, Ohio

"Love—the same old fashioned way,
Christmas—the new electrical way."
MRS. HAROLD R. BARRETT, Collins Center, N. Y.

"Electrified splendor met their gaze.
They could see labor lightened thru their 'days'."
MRS. MARGARET W. BENT, Westminster, Vermont

"Electric gifts for Xmas cheer
Help to brighten the New Year!"
MRS. CLYDE HINSHAW, R.F.D. 1, Fountain City, Ind.

"Christmas comes but once a year,
Electrical appliances bring constant cheer."
MRS. CHAS. WITHERELL, R.F.D. 2, Olan, N. Y.

"The beginning of a perfect day.
Electric aids have come to stay."
MRS. B. T. BULLIS, Rio Hondo, Tex.

"Electrical gifts make their future brighter,
By making the daily tasks much lighter."
ELOF STROM, R.F.D. 2, Maple Park, Ill.

RULES for FEBRUARY CONTEST

Ten cash prizes will be awarded for the 10 best titles for the picture on the front cover of this magazine.

The first prize will be $20 cash, and nine second prizes of $2 in cash will be awarded.

In case of a tie, each winning contestant will receive the full cash prize to which he or she is entitled.

Titles should be brief — the shorter the better—and short slogans will be given preference over rhymes.

All members of the farm family to whom this magazine was sent may submit titles, but each contestant may submit only one title.

Question "A" must be answered.

Entries must be sent to the Title Editor, ELECTRICITY ON THE FARM, 6 North Michigan Avenue, Chicago, Illinois, before March 1st.

Winning names and titles will be announced in the April issue.

Send your title on the coupon or make out a similar form on a plain sheet of paper or government postcard.

My title for the February Front Cover picture of ELECTRICITY ON THE FARM is.....

.....

.....

(a) Write on the line below the make and year of the automobiles and trucks on your farm.....

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My name is..... R.F.D.....

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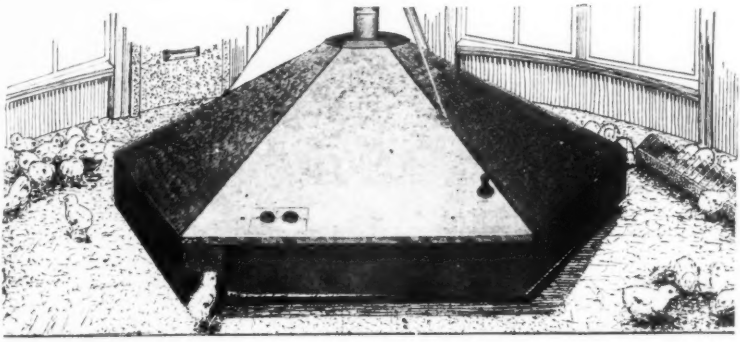

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